Open Access
J. Sustain. Econ. Dev., 2025, 3(2):103-110
ISSN (Online): 3005 -2513; ISSN (Print):3005-2505
DOI: https://doi.org/10.22194/JSD/25.1044
https://societyfia.org/journal/JSD

Socioeconomic Determinants of Pro-Environmental Behavior: Evidence from Faisalabad

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This research examines the socioeconomic determinants of pro-environmental behavior among residents of Faisalabad, Pakistan, a rapidly urbanizing city facing significant environmental pressures. Drawing on survey data from 284 participants, structural equation modeling (SEM) was applied to analyze the direct and indirect effects of key variables on eco-friendly actions, providing empirical insights into their interrelationships. While grounded in Faisalabad's local context, the analysis acknowledges broader applicability to national and international sustainability efforts. Key results indicate that trust in environmental institutions ($\beta = 0.120$, $p < 0.05$), individualism ($\beta = 0.215$, $p < 0.001$), and general environmental knowledge ($\beta = 0.111$, $p < 0.01$) exert statistically significant positive influences on pro-environmental behavior. Trust serves as a foundational element, underscoring the role of institutional credibility in motivating public engagement with sustainability initiatives. Similarly, individualism fosters personal responsibility and agency, acting as a strong driver of voluntary eco-friendly choices, while greater environmental knowledge enhances awareness and behavioral adoption. The SEM demonstrated excellent model fit ($\chi^2 = 0.00$, $p > 0.05$; RMSEA < 0.05), validating its capacity to capture these multifaceted dynamics. These findings offer practical guidance for policymakers, environmental agencies, and community leaders in Faisalabad, advocating targeted interventions such as trust-building campaigns, individualism-promoting education, and knowledge dissemination programs to cultivate sustainable practices. Although tailored to Faisalabad's socioeconomic landscape, the results suggest avenues for future cross-cultural research to assess generalizability and refine theoretical models in diverse settings.
Keywords: Pro-environmental behavior, socioeconomic determinants, trust, individualism, environmental knowledge, cultural variations sustainability.

INTRODUCTION

The idea of "environment" encompasses not only natural elements but also the broader surroundings that influence human life. Its interpretation is highly complex and evolves based on context, location, and time period, as noted by various researchers over the years (Xu et al., 2019). This dynamic understanding underscores the environment's critical role in supporting ecosystem functions and human well-being, affected by both natural processes and human interventions from governments and industries (Alcamo & Assessment, 2003)

Building on this, global frameworks like the United Nations Sustainable Development Goals (SDGs) provide structured objectives to tackle environmental challenges, emphasizing collective action for sustainability. These goals highlight the need for environmental knowledge to inform decisions and behaviors that minimize harm to the natural world. As defined by (Bennett et al., 2018), sustainable development involves adopting attitudes that protect the environment, bridging global aspirations with practical individual actions.

One key application of this knowledge is in pro-environmental behaviors, such as recycling, which promotes resource conservation through reduction, reuse, collection, and recovery of materials (Gherheş et al., 2022). When integrated with interdisciplinary approaches—from earth sciences to management and agriculture—such behaviors enable better environmental stewardship (Evans et al., 2021). This interconnectedness shows how global goals, informed knowledge, and targeted actions like recycling work together to address complex environmental issues.

When we study the environment, it's not just one thing - it covers many different things. It includes things like studying the earth and managing it better, keeping it clean and safe. It's

Mushtaq, S., Qaiser, I., & Naseem, A. (2025). Socioeconomic Determinants of Pro-Environmental Behavior: Evidence from Faisalabad. *Journal of Sustainable and Economic Development*, 3(2), 103-110.
[Received 4 Mar 2025; Accepted 10 Nov 2025; Published 10 Dec 2025]
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not just about science; it's also about figuring out how to take care of the environment through things like managing it, engineering, and farming. Paul's work has shown that. (Evans et al., 2021). All these studies together tell us that when we're dealing with problems about the environment, we should use lots of different ideas from different areas. It's through interdisciplinary collaboration- when different people work together, they can solve problems better. So, by using lots of different ways of thinking and knowledge from different fields, we can understand and solve the complicated problems the environment faces.

Environmental behavior, particularly in the context of recycling, is a crucial aspect of promoting sustainability and addressing environmental problems. Recycling involves the reduction, reuse, collection, and recovery of recyclable materials, which are sustainable behaviors that contribute to resource conservation and waste reduction. (Gherheș et al., 2022). Faisalabad, Pakistan's third-largest city, faces acute urban environmental challenges including groundwater depletion and industrial pollution (Altaf, 2017). These issues align with the global Sustainable Development Goals aimed at urban sustainability (United Nations, 2023).The study aims to identify socioeconomic factors that influence pro-environmental behavior in Faisalabad and to explore the main reasons and challenges individuals face when attempting to engage in pro-environmental behavior.

MATERIAL AND METHOD

According to research, the group of individuals selected for the research study is referred to as the research population, and the sample is a subset of that population (Banerjee and Chaudhuri, 2010). This investigation utilized a random sampling strategy. The information was collected from Faisalabad's municipal residents. The study's target population also included residents of the Faisalabad district. This study collected information from 284 respondents.

Sampling Technique: This survey was conducted just among the population of Faisalabad due to limitations in time and resources. The participants in the study were exclusively chosen from the city of Faisalabad. This research examines a set of particular factors, including recycling, Environmental Concerns, trust, Locus of control, collectivism, and environmental awareness, and their impact on the Dependent factors (DV) of Environmental Behavior and the adoption of environmentally friendly behaviors. To get a sample that accurately represents the population, a random probability sampling method was used. The selection of this approach was based on the impracticality of conducting a comprehensive survey of the total population residing in the Faisalabad area. The selection of sample units at random is a requirement of the probability sampling process, according to Hair et al. (2012). When executed accurately, this method may provide valuable insights into the behavior of the whole population.

The objective was to use a random probability sampling method to collect a comprehensive and unbiased sample of individuals from the different chai café, park entrance, and colony in Faisalabad. By evaluating the factors, examined this methodology enables derive significant insights on environmental behavior and the uptake of environmentally conscious actions among the population of Faisalabad.

***Data Analysis*:** The primary objective of this study is to determine the extent to which independent variables (such as recycling, environmental concerns, trust, locus of control, collectivism, and environmental awareness) affect dependent variables (such as environmental behavior and the adoption of environmentally friendly activities). In this investigation, the approach of structural equation modeling is be used for the data interpretation. However, to discover the relationship that exists between endogenous and exogenous constructions, the structural model, also known as the inner model, was used. In this research, numerous different measures of dependability were utilized for measurement. The path coefficient, the T-value, and the P-value are used in structural models to calculate the significance of each independent variable.

***Descriptive Statistics*:** Simple statistical methods such as frequencies and percentages are used to assess data, along with more advanced descriptive statistical techniques such as the mean and standard deviation. The present research used Stata software to do a descriptive analysis. Descriptive analysis is used to examine the demographic features with the aid of tables, pie charts, and histograms to illustrate the extracted frequencies and percentages.

***Empirical Statistics*:** Principal Component Analysis (PCA) is a versatile technique in econometrics and other fields, facilitating dimension reduction and addressing multicollinearity by transforming original variables into uncorrelated components, simplifying data interpretation. (Biresselioglu et al., 2015).

On the other hand, Structural Equation Modeling (SEM) is a powerful statistical approach used to comprehensively analyze complex relationships between variables and test theoretical models, making it invaluable in disciplines like social sciences and psychology. SEM allows for the examination of both direct and indirect effects, providing a deeper understanding of intricate systems and enabling researchers to assess the validity of their theoretical frameworks, as demonstrated in studies exploring factors influencing health outcomes (Akbar et al., 2020). Both PCA and SEM contribute significantly to enhancing data analysis, each addressing distinct analytical challenges and yielding valuable insights across diverse research domains.

***Research Paradigm*:** The paradigm is the investigator's "fundamental conviction frame or point of view. Robinson et al. (2005) say that a research model can help a researcher decide which method is best for their topic. Kaushik and

Walsh (2019) say that positivism, constructivism, and critical theory are the three most common ways that researchers do research. Positivist research is more often linked to a quantitative research model that says there is only one true reality that can be found through methods of in-depth observational study. Positivist theories require researchers to keep their distance from the people they are studying so they can collect and evaluate data objectively.

The purpose of this section is to define and support the concept of methodology and a particular method of data collection and analysis. An analyst must have a clear comprehension of his objectives in addition to his plans for getting there and accumulating the data he needs to do so. This study assessed the influence of Trust, locus of control, gk, collectivism, and region on Environmental behavior. As a result, we now have the essential framework for assembling trustworthy data and conducting research. As a result, we have a solid foundation for conducting accurate data collection and research. According to (Ishtiaq, 2019)), it examined three significant research categories: exploratory, descriptive, and explanatory. Using empirical or statistical methods, explanatory research has been used to evaluate the hypothesis and assess the relationships between variables Ponelis (2015) The research plan specifies the study's scope and methodology. Research methodologies include case studies, experiments, surveys, action studies, grounded theories, ethnographies, and anthropologies. A survey strategy is a comprehensive plan that details the investigation's course of action. The information may be qualitative, quantitative, or both (Darabi and Clark, 2013). This technique can be useful for verifying theories and investigating the causal relationships between theoretical concepts. Both qualitative and quantitative methodologies are utilized in research strategies. Our study employed a quantitative methodology. Theories and hypotheses were analyzed quantitatively using a variety of methods.

RESULTS AND DISCUSSION

***For pcaenb (Pro-environmental Behavior)*:** Hypothesis 1 (Direct Effect of Trust on Pro-Environmental Behavior): Accept H1 because the p-value (0.034) is less than α, indicating a significant direct effect of Trust on Pro-Environmental Behavior. This means that Trust has a significant influence on pro-environmental behavior.

Hypothesis 2 (Direct Effect of Individualism on Pro-Environmental Behavior): Accept H1 because the p-value (0.000) is less than α, indicating a highly significant direct effect of Individualism on Pro-environmental Behavior. This means that Individualism significantly influences pro-environmental behavior.

Hypothesis 3 (Direct Effect of gk on Pro-Environmental Behavior): Accept H1 because the p-value (0.002) is less than α, indicating a significant direct effect of gk on Pro-environmental Behavior.

This means that gk has a significant influence on pro-environmental behavior.

Table 1. Structural Equation Modeling (SEM) Results.

	Coef.	St. Err.	Z	P>z	[95%Conf.	Interval]
Structural Environment behavior						
region	-0.066	0.113	-0.590	0.556	-0.287	0.154
loc	0.055	0.056	0.970	0.332	-0.056	0.165
trust	0.120	0.057	2.120	0.034	0.009	0.231
health	0.063	0.057	1.100	0.271	-0.049	0.174
individualism	0.215	0.058	3.740	0.000	0.102	0.328
gk	0.111	0.036	3.110	0.002	0.041	0.181
_cons	-0.270	0.121	-2.220	0.026	-0.508	-0.032
sum_adaptation1 Environment behavior						
	0.054	0.025	2.160	0.031	0.005	0.104
region	-0.114	0.048	-2.400	0.016	-0.207	-0.021
loc	-0.025	0.024	-1.040	0.298	-0.071	0.022
trust	0.020	0.024	0.820	0.413	-0.027	0.067
health	-0.020	0.024	-0.820	0.415	-0.067	0.028
individualism	-0.028	0.025	-1.120	0.263	-0.077	0.021
gk	-0.001	0.015	-0.080	0.934	-0.031	0.029
_cons	0.851	0.052	16.450	0.000	0.749	0.952
var(e.pcaenb)		0.866	0.073	0.734	1.022	
var(e.sum_adaptation1)		0.154	0.013	0.131	0.182	

LR test of model vs. saturated: chi2(0) = 0.00, Prob > chi2 =

***For sum_adaptation1 (Adaptation Behavior)*:** Hypothesis 4 (Direct Effect of Pro-Environmental Behavior on Adaptation Behavior): Accept H1 because the p-value (0.031) is less than α, indicating a significant direct effect of Pro- environmental Behavior on Adaptation Behavior. This means that Pro-Environmental Behavior significantly influences adaptation behavior.

Hypothesis 5 (Direct Effect of Region on Adaptation Behavior): Accept H1 because the p-value (0.016) is less than α, indicating a significant direct effect of Region on Adaptation Behavior. This means that the Region has a significant influence on adaptation behavior.

Hypothesis 6 (Direct Effect of Trust on Adaptation Behavior): Reject H1 because the p-value (0.413) is greater than α, indicating no significant direct effect of Trust on Adaptation Behavior. This means that Trust does not have a significant influence on adaptation behavior based on the provided data.

Hypothesis 7 (Direct Effect of Individualism on Adaptation Behavior): Reject H1 because the p- value (0.263) is greater than α, indicating no significant direct effect of Individualism on Adaptation Behavior. This means that Individualism does not have a significant influence on adaptation behavior based on the provided data.

Hypothesis 8 (Direct Effect of gk on Adaptation Behavior): Reject H1 because the p-value (0.934) is much greater than α, indicating no significant direct effect of gk on Adaptation Behavior. This means that gk does not have a significant influence on adaptation behavior based on the provided data.

In summary, for pcaenb, Trust, Individualism, and gk have significant direct effects on Pro- environmental Behavior, while for sum_adaptation1, Pro-environmental Behavior and Region have significant direct effects, but Trust, Individualism, and gk do not.

***Path Coefficients*:** SEM, including the path coefficients (coeff.) and their statistical significance (p-value): Pro-Environmental Behavior (pcaenb): Pro-environmental behavior can be influenced directly by several factors:

Trust (coeff. = 0.120, $p < 0.05$): People who trust, commercial entities and people surrounding govt institutions, organizations, and authorities are more likely to engage in pro-

Table 2. Direct Effect.

	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
region	-0.066	0.113	-0.590	0.556	-0.287	0.154
loc	0.055	0.056	0.970	0.332	-0.056	0.165
trust	0.120	0.057	2.120	0.034	0.009	0.231
health	0.063	0.057	1.100	0.271	-0.049	0.174
individualism	0.215	0.058	3.740	0.000	0.102	0.328
Gk sum_adaption1	0.111	0.036	3.110	0.002	0.041	0.181
Environment						
Behavior	0.054	0.025	2.160	0.031	0.005	0.104
region	-0.114	0.048	-2.400	0.016	-0.207	-0.021
loc	-0.025	0.024	-1.040	0.298	-0.071	0.022
trust	0.020	0.024	0.820	0.413	-0.027	0.067
health	-0.020	0.024	-0.820	0.415	-0.067	0.028
individualism	-0.028	0.025	-1.120	0.263	-0.077	0.021
Gk	-0.001	0.015	-0.080	0.934	-0.031	0.029

Table 3. Indirect Effects.

	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Structural pacenb						
region	0		(no		path)	
loc	0		(no		path)	
trust	0		(no		path)	
health	0		(no		path)	
individualism	0		(no		path)	
Gk sum_adaption1 pcaenb	0		(no		path)	
region	-0.004	0.006	-0.570	0.570	-0.016	0.009
loc	0.003	0.003	0.880	0.376	-0.004	0.010
trust	0.007	0.004	1.510	0.131	-0.002	0.015
health	0.003	0.003	0.980	0.327	-0.003	0.010
individualism	0.012	0.006	1.870	0.062	-0.001	0.024
Gk	0.006	0.003	1.770	0.076	-0.001	0.013

environmental behavior. This positive coefficient indicates a statistically significant direct relationship. In practical terms, for every unit increase in trust, there is a corresponding increase of 0.120 units in pro-environmental behavior.

Health (coeff. = 0.062, p > 0.05): Although there's a positive coefficient, it's not statistically significant at the 0.05 level. This suggests that while health might influence pro-environmental behavior, the relationship is not strong enough to be considered significant in analysis. In other words, health doesn't appear to have a statistically significant direct effect on pro-environmental behavior.

Collectivism (coeff. = 0.215, p < 0.001): In societies that highly value collectivism, there is a notable and positive connection to pro-environmental behavior. This means that when people in these cultures prioritize working together and taking shared responsibility for environmental issues, it strongly encourages actions that are good for the environment. In simpler terms, when individuals in collectivist societies focus on the well-being of their community and collaborate to protect the environment, it has a significant and positive impact on pro-environmental actions. So, in these cultures, people tend to be more environmentally conscious and active.This strong positive coefficient indicates a highly significant relationship.

Knowledge (Gk) (coeff. = 0.111, p < 0.01): Well-informed individuals are more aware of the importance of pro-environmental actions, significantly increasing the likelihood of engagement. This positive coefficient is statistically significant.Positive Coefficient (0.111): A positive coefficient indicates a direct positive relationship between the "General Knowledge (Gk)" variable and "Pro-Environmental Behavior (pcaenb)." In simpler terms, as levels of general knowledge about environmental issues increase, pro-environmental behavior is more likely to increase as well.This means that the observed relationship between general knowledge and pro-environmental behavior is highly unlikely to be due to chance and is a robust effect in data. Behavior Change: The positive coefficient indicates that as general knowledge increases, pro-environmental behavior increases. This implies that education and awareness campaigns about environmental issues can be effective in promoting sustainable behaviors.

***Adaptation (sum_adaptation1): Adaptation could be influenced by factors related to pro- environmental behavior*:** Pro-Environmental Behavior (pcaenb) (coeff. = 0.054, p < 0.05): Individuals or communities actively engaged in pro-environmental behavior are better prepared to adapt to environmental changes. This relationship is statistically significant. In practical terms, for every unit increase in pro-environmental behavior, there is a corresponding increase of 0.054 units in adaptation. Adaptation could also be influenced directly by other factors:

Region and Loc (Locus of control) (coeff. = -0.114, p < 0.05): Geographical regions with specific environmental conditions significantly affect adaptation. The negative coefficient suggests that certain regions might require more adaptation efforts. In practical terms, for every unit increase in region and loc, there is a corresponding decrease of 0.114 units in adaptation.

Trust (coeff. = 0.019, p > 0.05): Trust in government institutions has a positive coefficient, but it's not statistically significant at the 0.05 level. This indicates that while trust might influence adaptation, it does not have a strong or significant effect.

Health (coeff. = -0.019, p > 0.05): Individual health doesn't have a statistically significant direct effect on adaptation. In other words, health doesn't appear to significantly impact an individual's capacity to adapt to the environmental.

Individualism (coeff. = -0.028, p > 0.05): Cultural values related to individualism are negatively related to adaptation, but this relationship is not statistically significant. In practical terms, individualism doesn't appear to have a significant direct effect on adaptation in analysis.

General Knowledge (Gk) (coeff. = 0.006, p > 0.05): Knowledge about environmental issues has a positive

Table 4. Results of Total Effects.

	Coef.	Std. Err.	z	P>z	[95%Conf.	Interval]
Structural Environment Behavior region	-0.066	0.113	-0.590	0.556	-0.287	0.154
loc	0.055	0.056	0.970	0.332	-0.056	0.165
trust	0.120	0.057	2.120	0.034	0.009	0.231
health	0.063	0.057	1.100	0.271	-0.049	0.174
individualism	0.215	0.058	3.740	0.000	0.102	0.328
General knowledge Sum_adaption1	0.111	0.036	3.110	0.002	0.041	0.181
Environment behavior	0.054	0.025	2.160	0.031	0.005	0.104
region	-0.118	0.048	-2.460	0.014	-0.212	-0.024
loc	-0.022	0.024	-0.910	0.363	-0.069	0.025
trust	0.026	0.024	1.090	0.276	-0.021	0.073
health	-0.016	0.024	-0.670	0.503	-0.064	0.031
individualism	-0.016	0.025	-0.660	0.508	-0.064	0.032
General knowledge	0.005	0.015	0.310	0.754	-0.025	0.034

coefficient, but it's not statistically significant in influencing adaptation. In other words, general knowledge doesn't appear to have a significant direct impact on an individual's capacity to adapt to environmental changes.

These path coefficients and p-values provide insights into the strength and significance of each variable's influence on pro-environmental behavior and adaptation.

DISCUSSION

The study investigates at the factors that influence pro-environmental behavior (pcaenb) and adaptive behavior (sum_adaptation1). The data indicate that trust, individuality, and general knowledge all have a substantial impact on pro-environmental behavior. People who trust institutions, live in individualistic cultures, and have high environmental awareness are more likely to take environmentally positive acts. However, the study raises concerns regarding the direct influence of place and area on pro-environmental behavior.

Being environmentally conscious has been highlighted as a critical component in better preparing to adapt to environmental changes in the context of adaption behavior. Furthermore, the study emphasizes the importance of geographical heterogeneity in determining adaption methods. Despite these favorable correlations, the direct impacts of trust, individuality, and public knowledge on adaption behavior are being investigated.

In simple terms, the discussion focuses on the complex links between trust, individuality, and knowledge, as well as their impact on pro-environmental and adaptive actions. The study complicates our understanding of these interactions, motivating more investigation into the delicate interaction of human beliefs and environmental behaviors.

***Conclusion & Recommendation*:** In conclusion, this research provides valuable insights into the socioeconomic factors influencing pro-environmental behavior in Faisalabad, Pakistan. Trust, individualism, and knowledge have surfaced as pivotal drivers of eco-friendly actions. These findings not only align with international trends but also offer actionable guidance for policymakers, community leaders, and environmental advocates in Faisalabad to tailor interventions that resonate with the local context and foster a culture of sustainability and environmental stewardship. As Faisalabad strives to become a more environmentally conscious city, understanding these determinants can pave the way for a greener and more sustainable future. In conclusion, this research has investigated into the socioeconomic determinants of pro-environmental behavior in Faisalabad, shedding light on key factors influencing individuals' choices and actions regarding environmental conservation. Through a rigorous analysis using a structural equation model (SEM), several significant findings have emerged:

Trust Matters: Trust in environmental organizations and initiatives plays a pivotal role in driving pro-environmental behavior. Building and maintaining trust should be a priority for policymakers and organizations seeking community involvement in eco-friendly initiatives. Individualism as a Motivator: The study underscores the importance of promoting individualism in environmental actions. Highlighting how personal choices can contribute to a healthier environment can inspire more sustainable behaviors among residents. Knowledge Fuels Change: General knowledge about environmental issues and solutions significantly influences pro-environmental behavior. Educational campaigns and initiatives should aim to enhance public awareness and knowledge on these matters.

Community Engagement is Vital: The findings emphasize the need for community-based projects and initiatives. Collaborative efforts, such as tree planting drives and neighborhood clean-up events, not only improve the local environment but also foster a sense of shared responsibility. Youth as Catalysts: Engaging the youth in environmental activities and education can have a profound impact on shaping a more environmentally conscious future. Youth-led initiatives should be encouraged and supported. These insights hold particular significance for Faisalabad, but they can also serve as valuable lessons for regions both within Pakistan and internationally. By addressing these determinants and implementing the recommended strategies, Faisalabad can move closer to becoming a more sustainable and environmentally friendly city.

In this era of global environmental challenges, local actions matter immensely. Faisalabad has the potential to set an example for other cities by promoting pro-environmental behavior, embracing sustainability, and fostering a strong sense of community involvement. Through collaborative efforts and a commitment to positive change, Faisalabad can contribute to a more environmentally sustainable and resilient future for all its residents.

In the specific context of Faisalabad, these research findings hold immense significance for local governance and environmental organizations. The implications suggest tangible actions to foster pro-environmental behavior and sustainability: Prioritize community engagement and trust-building, implement effective recycling programs, integrate environmental education into schools, conduct regular community clean-up drives, promote public transportation for reduced emissions, and invest in green spaces. Policymakers, environmental organizations, and community leaders should collaborate, emphasizing trust, awareness, and individual responsibility. Recognizing efforts, monitoring, and ongoing research can transform Faisalabad into a model for pro-environmental behavior. Continue conducting research to track changes in pro-environmental behavior over time. Collect and analyze data to identify evolving trends and areas that require attention. Implementing these recommendations

requires a concerted effort from all stakeholders. By working together and prioritizing environmental sustainability, Faisalabad can become a model city for pro-environmental behavior and inspire positive change on a larger scale.

***Acknowledgement*:** The authors gratefully acknowledge the residents of Faisalabad who participated in this survey and generously shared their time and perspectives. The authors also thank the Department of Economics, Government College University Faisalabad, for providing academic support and a conducive research environment during the conduct of this study.

***CRediT author statement*:** Sulman Mushtaq: Conceptualization, data collection, and preliminary analysis. Imran Qaiser: Methodology design, structural equation modeling (SEM), and statistical analysis. Asia Naseem: Literature review, manuscript writing, critical revisions, supervision, and correspondence.

***Conflict of interest*:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

***Ethical statement*:** This study was conducted in accordance with internationally accepted ethical standards for research involving human participants. Ethical approval was obtained from the Ethics Committee of the Department of Economics, Government College University Faisalabad.

***Availability of data*:** The data supporting the findings of this study are available from the corresponding author upon reasonable request. Due to ethical and privacy considerations, the raw survey data are not publicly available.

***Consent to participate*:** All participants voluntarily agreed to participate in the study after being informed about the research objectives, procedures, and their rights as participants.

***Informed consent*:** Written informed consent was obtained from all individual participants prior to their inclusion in the study.

***Consent for publication*:** All authors have reviewed the final manuscript and provided consent for its publication.

***SDGs addressed*:** Climate Action; Sustainable Cities and Communities.

***Policy referred*:** Pakistan's National Climate Change Policy; National Environmental Policy.

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REFERENCES

A manual for selecting sampling techniques in research. (n.d.). *Munich Personal RePEc Archive*. https://mpra.ub.uni-muenchen.de/70218/

Akbar, A. N., & Gilroy, D. W. (2020). Aging immunity may exacerbate COVID-19. *Science*, *369*(6501), 256-257. https://doi.org/10.1126/science.369.6501.256

Altaf, S. (2021). *Sustainable urban groundwater governance in Faisalabad, Pakistan: Challenges and possibilities* (Doctoral dissertation, University of Louisville). *Electronic Theses and Dissertations*. https://doi.org/10.18297/etd/3779

Alcamo, J., & Millennium Ecosystem Assessment. (2003). *Ecosystems and human well-being: A framework for assessment*. Island Press.

Anon, M., & Kumar, R. (2021). Impact and assessment of climate change on biological diversity. 108-122. https://doi.org/10.26832/aesa-2021-bdcp-07

Ansari, R. M., Harris, M., Hosseinzadeh, H., & Zwar, N. (2020). Application of structural equation modeling in assessing the self-management activities of patients with type 2 diabetes. *Journal of Primary Care & Community Health*, *11*, 2150132720974204. https://doi.org/10.1177/2150132720974204

Aspers, P., & Corte, U. (2019). What is qualitative in qualitative research. *Qualitative Sociology*, *42*(2), 139-160. https://doi.org/10.1007/s11133-019-9413-7

Atkinson, Q., Coomber, T., Passmore, S., Greenhill, S., & Kushnick, G. (2016). Cultural and environmental predictors of pre-European deforestation on Pacific Islands. *PLOS ONE*, *11*(5), e0156340. https://doi.org/10.1371/journal.pone.0156340

Banerjee, A., & Chaudhury, S. (2010). Statistics without tears: Populations and samples. *Industrial Psychiatry Journal*, *19*(1), 60. https://doi.org/10.4103/0972-6748.77642

Bennett, N. J., Whitty, T. S., Finkbeiner, E., Pittman, J., Bassett, H., Gelcich, S., & Allison, E. H. (2018). Environmental stewardship: A conceptual review and analytical framework. *Environmental Management*, *61*(4), 597-614. https://doi.org/10.1007/s00267-017-0993-2

Biresselioğlu, M. E., Yelkenci, T., & Öz, İ. Ö. (2015). Investigating the natural gas supply security: A new perspective. *GCRIS Database, Izmir University of Economics*. https://gcris.ieu.edu.tr/handle/20.500.14365/1194

Boone, C. G., Pickett, S. T. A., Bammer, G., Bawa, K., Dunne, J. A., Gordon, I. J., Hart, D., Hellmann, J., Miller, A., New, M., Ometto, J. P., Taylor, K., Wendorf, G., Agrawal, A., Bertsch, P., Campbell, C., Dodd, P., Janetos, A., & Mallee, H. (2020). Preparing interdisciplinary leadership for a sustainable future. *Sustainability Science*, *15*(6), 1723-1733. https://doi.org/10.1007/s11625-020-00823-9

Cammarano, A., Perano, M., Michelino, F., Del Regno, C., & Caputo, M. (2022). SDG-oriented supply chains: Business practices for procurement and distribution. *Sustainability*, *14*(3), 1325. https://doi.org/10.3390/su14031325

Cuervo-Robayo, A., Ureta, C., Gómez-Albores, M., Meneses-Mosquera, A., Téllez-Valdés, O., & Martínez-Meyer, E. (2018). One hundred years of climate change in Mexico. *bioRxiv*. https://doi.org/10.1101/496216

Darabi, F., & Clark, M. (2013). Developing a general analytical inductive qualitative research strategy to investigate business school-industry collaboration. In *Proceedings of the 12th European Conference on Research Methods (ECRM 2013)* (pp. 108-117).

Donkersloot, R., Black, J. C., Carothers, C., Ringer, D., Justin, W., Clay, P. M., Poe, M. R., Gavenus, E. R., Voinot-Baron, W., Stevens, C., Williams, M., Raymond-Yakoubian, J., Christiansen, F., Breslow, S. J., Langdon, S. J., Coleman, J. M., & Clark, S. J. (2020). Assessing the sustainability and equity of Alaska salmon fisheries through a well-being framework. *Ecology and Society*, *25*(2). https://doi.org/10.5751/ES-11549-250218

Evans, D. L., Janes-Bassett, V., Borrelli, P., Chenu, C., Ferreira, C. S. S., Griffiths, R. I., Kalantari, P., Steenhuis, T. S., Thomas, A., & Visser, S. M. (2021). Sustainable futures over the next decade are rooted in soil science. *European Journal of Soil Science*, *73*(1). https://doi.org/10.1111/ejss.13145

Gallopín, G. C. (2003). *A systems approach to sustainability and sustainable development*. ECLAC.

Gherheș, V., Fărcașiu, M. A., & Para, I. (2022). Environmental problems: An analysis of students' perceptions towards selective waste collection. *Frontiers in Psychology*, *12*, 803211. https://doi.org/10.3389/fpsyg.2021.803211

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, *40*(3), 414-433.

Ishtiaq, M. (2019). Book review: Creswell, J. W. (2014). Research design: Qualitative, quantitative and mixed methods approaches (4th ed.). *English Language Teaching*, *12*(5), 40. https://doi.org/10.5539/elt.v12n5p

Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a research paradigm and its implications for social work research. *Social Sciences*, *8*(9), 255. https://doi.org/10.3390/socsci8090255

MacDougall, A., & Beltrami, H. (2017). Impact of deforestation on subsurface temperature profiles: Implications for the borehole paleoclimate record. *Environmental Research Letters*, *12*(7), 074014. https://doi.org/10.1088/1748-9326/aa7394

Mon, M., Mizoue, N., Htun, N., Kajisa, T., & Yoshida, S. (2012). Factors affecting deforestation and forest degradation in selectively logged production forest: A case study in Myanmar. *Forest Ecology and Management*, *267*, 190-198. https://doi.org/10.1016/j.foreco.2011.11.036

Ponelis, S. R. (2015). Using interpretive qualitative case studies for exploratory research in doctoral studies: A case of information systems research in small and medium enterprises. *International Journal of Doctoral Studies*, *10*, 535.

Robinson, T. N., & Sirard, J. R. (2005). Preventing childhood obesity: A solution-oriented research paradigm. *American Journal of Preventive Medicine*, *28*(2), 194-201.

Rolett, B., & Diamond, J. (2004). Environmental predictors of pre-European deforestation on Pacific Islands. *Nature*, *431*(7007), 443-446. https://doi.org/10.1038/nature02801

Soni, D., & Ansari, F. (2017). Climate change and biodiversity: Impacts, vulnerability and mitigation in Indian perspective. *Journal of Applied and Natural Science*, *9*(1), 632-638. https://doi.org/10.31018/jans.v9i1.1243

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, *29*(3), 309-317.

United Nations. (n.d.). *Sustainable development goals*. https://sdgs.un.org/goals

Xu, J. (2014). Context: From static to dynamic. *International Journal of Language and Linguistics*, *2*(2), 127-133. https://doi.org/10.11648/j.ijll.20140202.21

Zhong, D., Wang, X., Xu, T., Zhou, G., Wang, Y., Lee, M., & Yan, G. (2016). Effects of microclimate condition changes due to land use and land cover changes on the survivorship of malaria vectors in China-Myanmar border region. *PLOS ONE*, *11*(5), e0155301. https://doi.org/10.1371/journal.pone.0155301